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**REMARKS**

Claims 1-56 were pending in the application. In response to the office action, applicants have cancelled claims 12 and 16, and amended claims 15, 17-18, 50, and 54. Claims 1-56 remain pending in the application for reconsideration.

The applicant wishes to thank the Examiner for indicating allowable subject matter in claims 17, 24, 28, and 46. Claim 17 has been rewritten in independent form to place the claim in condition for allowance.

Claims 15-18 were objected to because of an editorial problem. Claims 50 and 54 were objected to because of a dependency problem. Applicants thank the Examiner for the thorough review and have amended these claims to address the objections.

By way of background, for the benefit of the Examiner and without limiting any particular claim recitations, some embodiments of the present invention are related to a coordinated prefetching system between the host and the device, wherein the data source includes improved prefetching on its own without specific prefetch instructions from the data requestor. For example, in some embodiments, a storage device may decide on its own either to prefetch or not to prefetch certain data based on a rotational position of the device.

By way of contrast, in the prior art, prefetching instructions are provided primarily by the host, or, when performed by the storage device, do not selectively determine which data to prefetch to improve the performance.

Claims 1-5, 10, 19-23, 25-26, 29-31, and 35-43 are rejected under 35 U.S.C. § 102(b) as being anticipated by Macon (U.S. Patent No. 5,410,653). Although not expressly called out, the body of the rejection appears to include claims 49, 51-52, 53, and 55-56 as also being anticipated by Macon. Applicants respectfully traverse this rejection for the following reasons.

With respect to claim 1, Macon appears to describe a conventional host / storage arrangement in which the prefetching is determined by the host. Claim 1 recites that the data requestor may receive reply data including the demand data and optionally also unspecified prefetch data. However, as described in Macon in the cited portion of col. 2,

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lines 17-25, "a single I/O request is sent to the device driver to obtain both the Demand and to Prefetch the Read-Ahead data block(s)." Accordingly, Macon does not teach that the prefetch data is unspecified. If the rejection is maintained, applicants respectfully request that the Examiner identify with particularity which portions of Macon are relied upon for teaching that the data requestor may receive reply data including the demand data and optionally also unspecified prefetch data.

Moreover, claim 1 further recites a data source coupled to the data requestor over the communication link and which has the ability to determine which prefetch data to send to the data requestor with the demand data. The office action correctly identifies element 4 of Macon as a data source. However, the other cited portions (namely the Abstract, col. 2, lines 17-25, and col. 4, lines 24-30) describe actions which take place at the data requestor (e.g. between CPU 2 and main memory 3), not at the data source (e.g. disk 4). Macon expressly states that the file system described therein is "embodied within a program that is executed by the CPU 2." (see col. 4, lines 52-55). Macon is silent as to any activity occurring at the disk 4, other than the return of data requested by the CPU 2 (by the program running in main memory 3). Accordingly, Macon only teaches the conventional system wherein the host determines what data to prefetch. If the rejection is maintained, applicants respectfully request that the Examiner identify with particularity which portions of Macon are relied upon for teaching that a data source coupled to the data requestor over the communication link and which has the ability to determine which prefetch data to send to the data requestor with the demand data.

Because Macon fails to teach or suggest the above noted aspects of claim 1, claim 1 is not anticipated by and is patentable over Macon. Claims 2-4 and 10 depend either directly or indirectly from claim 1 and are therefore also patentable.

With respect to claim 19, the claim recites that the reply data includes the demand data and potentially also prefetch data which was not identified by the storage driver. For the reasons given above in connection with claim 1, the relied upon element 7 is merely the conventional disk cache 7 which might contain prefetch Read-Ahead data that was requested by the host together with the Demand data. Macon does not teach or suggest receiving reply data from the storage system which potentially includes prefetch data

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which was not identified by the storage driver. Accordingly, claim 19 and its dependent claims 20-23 are not anticipated by and are patentable over Macon.

With respect to claim 25, the claim recites the storage system determining which prefetch data to include with the demand data. Again, the office action correctly identifies the disk 4 as corresponding to the storage system, but incorrectly associates the activities described in the other cited portions. As noted above, the other cited portions describe activities taking place at the host, not at the disk 4. Because Macon does not teach or suggest that the disk 4 determines which prefetch data to include with the demand data, claim 25 and its dependent claims 26 and 29-31 are patentable over Macon.

With respect to claim 35, the rejection is not understood. The office action cites Fig. 6, blocks A, G, and N, together with col. 5, lines 57-59, col. 6, lines 59-68, Fig. 2C, col. 5, lines 12-16 and col. 7, lines 13-16, without explaining how these disparate portions are fairly connected together in any way that reads on the claim as a whole. It is improper to use the claim as a blueprint to pick and choose different portions of the reference which otherwise have nothing to do with each other. In fact, the office action relies on identical portions of the reference as anticipating distinct claim recitations (col. 6, lines 59-68 relied on twice; col. 5, lines 12-16 relied on twice; and col. 7, lines 13-16 relied on twice). If the rejection is maintained, clarification is respectfully requested.

In any event, the office action fails to identify a second request for the demand data. The relied upon block G corresponds to prefetch data. The relied upon block N is the fetch of the data, not a second request for the demand data. The Examiners analysis with respect to Macon fails because the driver described in Macon performs the prefetch directly from the host, and not in cooperation with an improved prefetch routine running on the data source.

Applicants further note that the relied upon portions of col. 5, lines 12-16 and col. 7, lines 13-16 do not mention anything other than addresses of the data in the cache. Macon does teach or suggest using identifying data to selectively retrieve the demand data from the reply data.

Because the disparate portions of Macon cited in the office action fail to establish anticipation, and because, among other things, Macon fails to teach or suggest the recited second request for demand data or using identifying data to selectively retrieve the

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demand data from the reply data, claim 35 and its dependent claims 36-41 are not anticipated by and re patentable over Macon.

With respect to claim 42, the claim recites a storage system determining what prefetch data to include with the demand data. For the reasons noted above, Macon discloses only that the host (e.g. the data requestor) determines what prefetch data to include with the demand data. Applicants note that various of the cited portions describe operations of the CPU 2 and main memory 3, not the disk 4. Accordingly, claim 42 and its dependent claim 43 are not anticipated by and are patentable over Macon.

Claim 49 and its dependent claims 50-52 are believed to be patentable for the reasons given above with respect to claim 35. Claim 53 and its dependent claims 54-56 are believed to be patentable for the reasons given above with respect to claim 42.

Claims 12-14, 16, and 18 are rejected under 35 U.S.C. § 102(e) as being anticipated by Bates (U.S. Patent No. 6,633,957). Applicants respectfully traverse this rejection for the following reasons.

Claim 12 has been cancelled and claim 13 has been rewritten in independent form. With respect to claim 13, the claim recites that the at least one prefetch algorithm includes the ability to utilize a rotation state of the rotating storage drive in determining which prefetch data to include with the demand data in the response. Bates is silent in this regard. The cited portions of Figs. 2A-B, event E2 and col. 3, lines 27-33 are completely devoid of any mention of the rotation state of the storage drive. Accordingly, claim 13 and its dependent claim 14 are not anticipated by and are patentable over Bates.

Claim 14 further recites that the rotation state includes whether the prefetch data will arrive at a read head of the rotating storage drive before the demand data, or after the demand data. The same cited portions are completely devoid of any mention of the read head of the storage device. Accordingly, claim 14 is separately patentable over Bates.

Claim 16 has been cancelled and incorporated into allowable claim 17. Claim 18 has been amended to depend from allowable claim 17.

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Claims 6-9 and 32-34 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Macon in view of Okayasu (U.S. Patent No. 6,449,696). Applicants respectfully traverse this rejection for the following reasons.

Okayasu, which is relied on for other aspects of the claims, fails to make up for the above noted deficiencies in Macon as applied to respective independent claims 1 and 25. Accordingly, these claims are patentable for the reasons given above with respect to their respective independent claims.

Claims 11, 27, 44-45, and 47-48 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Macon. Applicants respectfully traverse this rejection for the following reasons.

With respect to Claim 11, the claim depends from claim 1 and accordingly is patentable for at least the reasons given above in connection with claim 1. Claim 11 further recites that the data requestor specifies null demand data. The office action admits that Macon fails to teach the recited claim, but asserts without support that such claim recitations would be obvious. Contrary to the unsupported assertion, nothing in Macon suggests that the disk 4 would perform prefetching absent a request for Demand data. Even assuming for the sake of argument that prefetching may effectively be used "when the host does not request for data", nothing in Macon teaches or suggests that the CPU 2 might specify null demand data, as an initiation of a prefetch operation or otherwise. Accordingly, claim 11 cannot possibly be obvious over Macon.

With respect to Claims 27 and 44, the claims depend indirectly from claims 25 and 42, respectively, and accordingly are patentable for at least the reasons given above in connection with their respective independent claims. Claims 27 and 44 recite feature related to the storage system determining which prefetch data to include, based at least in part on a state of the storage system including whether the prefetch data is already in a cache in the storage system. The office action admits that Macon fails to teach the recited claim, but asserts without support that such claim recitations would be obvious. Contrary to the unsupported assertion, nothing in Macon suggests that the disk 4 makes any determination regarding prefetching, let alone the further recitations of these claims.

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Accordingly, claims 27 and 44 are separately patentable over Macon. Claim 45 depends from claim 44 and is likewise patentable.

With respect to claims 47 and 48, claim 47 recites that the state comprises whether the prefetch data can be efficiently retrieved following the demand data and claim 48 depends from claim 47 and further recites that the state comprises whether the prefetch data will cause a head seek. Macon is silent in this regard. Applicants note that the cited Fig. 2C actually describes the situation where the prefetch does not follow the demand data, but rather a second I/O request is made for the non-contiguous data. Moreover, Macon describes that the contiguous data is prefetched without regard to efficiency. With respect to claim 48, the cited portions are completely devoid of any mention of a head seek. Accordingly, claims 47 and 48 are respectively separately patentable over Macon.

Claim 15 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Bates. Applicants respectfully traverse this rejection for the following reasons.

Claim 15 recites that the demand data request specifies null demand data. The office action admits that Bates fails to teach the recited claim, but asserts without support that such claim recitations would be obvious. Contrary to the unsupported assertion, nothing in Bates suggests that the controller 10 would perform prefetching absent a request for demand data. Even assuming for the sake of argument that prefetching may effectively be used "when the host does not request for data", nothing in Bates teaches or suggests that the host CPU 14 might specify null demand data, as an initiation of a prefetch operation or otherwise. Accordingly, claim 15 cannot possibly be obvious over Bates.

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In view of the foregoing, favorable reconsideration and withdrawal of the rejections is respectfully requested. Early notification of the same is earnestly solicited. If there are any questions regarding the present application, the Examiner is invited to contact the undersigned attorney at the telephone number listed below.

Respectfully submitted,

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Date

Intel Americas  
LF3  
4030 Lafayette Center Drive  
Chantilly, VA 20151



Paul E. Steiner  
Reg. No. 41,326  
(703) 633 - 6830